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## Experience in Application of Mini-Invasive Methods in Proctology

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**Abstract:** Mini-invasive methods of treating pathology of the anal canal have existed since the very beginning of the development of medicine. Even Hippocrates used high temperatures to cauterize bleeding hemorrhoids, and in ancient China, doctors applied aggressive chemical mixtures to coagulate them. All this is possible due to the anatomical features of the anorectal zone, in particular, the absence of pain receptors above the dentate line. Purpose of the work: to increase the efficiency of treatment of patients with hemorrhoidal disease using minimally invasive techniques at the clinical base of the Department of Surgery No. 1 of the State Institution "Dnepropetrovsk Medical Academy of the Ministry of Health of Ukraine", where the following methods of treating hemorrhoidal disease are used: low-traumatic (instrumental): - latex ligation of hemorrhoids - the imposition of latex rings on the tissue of internal hemorrhoids, - suture ligation of hemorrhoidal arteries under the control of ultrasound dopplerometry (transanal hemorrhoidal dearterization - THD method). Ligation of hemorrhoids with latex rings is a fairly simple, inexpensive and at the same time effective technique. Having a minimum of contraindications, it successfully replaces the surgical removal of nodes, at least for some time. The main thing is to carry it out on time and correctly. After performing THD, mucosal necrosis does not occur, as with other minimally invasive methods of treatment. The wound surface is absent, which significantly improves the patient's quality of life in the postoperative period and shortens the rehabilitation period. Subject to the recommendations of the attending physician, the patient can go to work 2 days after the THD procedure.

**Keywords:** Mini-invasive, Treatment, Hemorrhoids, Latex ligation, THD

### Introduction

For the first time, the description of the procedure for ligating a hemorrhoid is attributed to Hippocrates. In 1954, was first proposed the use of a device-ligator to apply rubber rings to internal hemorrhoids. In 1962, was improved the ligator, and published the results of the first experiments on ligating hemorrhoids in 150 patients in 1963. The analysis of the effectiveness of modern minimally invasive methods of treatment of hemorrhoids, used in practical coloproctology, was carried out, to evaluate the effectiveness of this application. In a comparative aspect, the effectiveness of the clinical application of various minimally invasive methods for the treatment of hemorrhoids and other anorectal pathology was evaluated, according to the data of the world and domestic literature. (Schouten & van Vroonhoven, 1986).

Analysis of the literature convincingly shows that, despite the developed numerous methods of surgical interventions and minimally invasive operations for hemorrhoids, with the study of their immediate and long-term results, all of them finally do not satisfy either surgeons or patients. This is due to the prevalence of the pathology of the anorectal region itself, late treatment of patients for medical care, as well as the widespread introduction of traditional types of surgical interventions in most medical institutions of the republic. Each method has strict indications and contraindications for use, specific complications and failures.

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THD - this technique has been introduced relatively recently and has already received many positive feedback on its application. During the intervention, pathologies of the structure of hemorrhoids are eliminated, and they are not removed. This provides a minimally invasive and more gentle way to get rid of the disease.

The essence of the method is the ligation of the terminal branches of the arteries feeding the hemorrhoids. The accuracy of the technique is ensured by special equipment: a proctoscope with a Doppler sensor that determines the location of the arteries. The proctoscope is also equipped with a special window for suturing at the dressing sites. After that, the rectal section is folded above the edge level. A similar procedure is called pexia or corrugation and is aimed at preventing further prolapse of hemorrhoids. The procedure has shown the greatest efficiency in the treatment of hemorrhoids in the second and third stages.

## **Method**

In modern proctology, two types of latex ligation are common, depending on the ligator used:

- vacuum ligation - using a vacuum ligator, sucking the node into a cylindrical tip (glass), on the outer surface of which a ring is put on the node, dropped onto the base of the internal hemorrhoidal node with a special lever;
- mechanical ligation - when a knot is inserted into a hollow cylindrical tip using special hemorrhoidal forceps.

Regardless of the chosen ligation method, for the procedure, an anoscope is inserted into the rectum - usually no more than 18- 21 mm in diameter, 50-54 mm long, 54 mm in length, thus the proctologist gains access to the internal hemorrhoids. (Templeton et al., 1983).

The technique effectively helps in stage 1-3; Stage 4 hemorrhoids, or internal hemorrhoids combined with an anal fissure or pararectal fistula, are usually treated promptly. Hemorrhoids aggravated by internal or external thrombosis are recommended to be transferred to the stage of remission by conservative means to reduce the risk of pain effect and more than acceptable bleeding during ligation.

External hemorrhoids and anal fringes are not treated with latex ligation. The recovery period is characterized by less pain and discomfort for the patient. Usually, negative symptoms disappear after 1-2 days after the procedure, and it will be possible to return to the usual rhythm of life in three to four days. In order to avoid repeated relapses of the disease, it is necessary to eliminate the negative factors provoking it, and also to revise the diet and physical activity.

Nowadays, the THD method has become available - a bloodless and practically painless procedure that provides permanent elimination of symptoms and rapid patient recovery. When performing the procedure, the tissue of hemorrhoids is not removed, but internal sutures are applied to the rectal mucosa (without its incision), in the area where there are no pain receptors. In this case, the arteries are ligated, which provide blood flow to the hemorrhoids. Thus, the patient receives effective treatment and painless, quick recovery of the general condition and ability to work. The THD Evolution apparatus is used for accurate arterial ligation. The course of the procedure is monitored using a Doppler probe (ultrasound transducer).

It is important that after the procedure, the patient can go home on the day of the operation or the next day, and after 3-4 days he can completely return to his usual way of life. This two methods treatment of hemorrhoids (latex ligation and THD) used in Dnipro City Clinic #6 on base SI "Dnipropetrovsk Medical Academy Ministry of Health of Ukraine". (Sulyma et al., 2019).

## **Results and Discussion**

*Results of removal of internal hemorrhoids using lateral ligation:*

Ligation of hemorrhoids with latex rings is possible only, when clear boundaries are formed between the vascular bundle and the base leg. The ring is securely fixed on the leg of the node, pinching the supply vessel. The procedure is carried out at the stage of stabilization of the nodules, when there are no signs of inflammation and bleeding. In one session, 1 node are subjected to ligation, no more. This is necessary to prevent discomfort in the postoperative period. Latex anchors that compress tissue can be uncomfortable for the

first two days. One or two rings are a minimum of anxiety, so doctors prefer to treat hemorrhoids with latex rings in several sessions. Complications in the form of rectal bleeding, or premature separation of the ligature, arising after ligation of the nodes, are most often associated with a violation of the specialist's prescription. (Wroblewski et al., 1980).

After the operation, it is prohibited:

- lift weights;
- consume alcohol, fatty, spicy foods;
- visit the gym;
- visit the bathhouse and sauna;
- be in the "sitting" position for more than an hour (a warm-up is necessary);
- engage in heavy physical labor.

If all the recommendations and requirements of a specialist are met, no complications will arise. The dying off of the nodes occurs gradually, within 2-4 days, as the latex ring cuts through the base of the leg. Fragments of the decayed vascular tissue are removed through the intestines along with excrement.

#### *Results of removal of internal hemorrhoids using THD:*

The dearterization technology (THD) involves the use of specialized equipment, consisting of an operating proctoscope with an ultrasonic sensor, an intelligent unit with a sound transducer and the ability to graphically display a signal on the screen. Depending on the technical characteristics of the equipment, it is possible to search for the vessels feeding the hemorrhoids, which can range from 3 to 6-7 and, as some authors write, more arteries. The arteries feeding the pathologically altered hemorrhoids are detected by an ultrasonic sensor using a pulse wave, which is converted into a graphic image in the intelligent unit and accompanied by an audio signal.

The manipulation window of the operating proctoscope allows, without touching the patient, to carry out suture ligation of the identified vessels, completely blocking the blood flow to the pathologically altered hemorrhoidal node, and, if necessary, to pull the node down beyond the rectum to the anatomical bed and fix it to the mucosa. Depending on the model of the device, it is possible to carry out a complete surgical intervention at one time. The procedure is painless and safe for the patient. Over the next time, the pathologically altered tissues gradually decrease in size, cease to be injured and bleed, and then are replaced by connective tissue.

According to numerous publications, dearterization is pathogenetically justified. However, at stage III, the prolapse of internal hemorrhoids persists in 15%, and at stage IV in 50% of cases. At III-IV stages of the disease, transanal doppler controlled dearterization should be performed only with mucopexy. The widely used twisting suture in mucopexy and lifting, despite its low invasiveness, can cause a rather pronounced pain syndrome that requires taking analgesics for up to 7 days, while periodic bleeding from the anus in some cases is noted up to 30 days, recurrences of prolapse of internal hemorrhoids reach up to 30% of cases, and a high frequency of dysuric disorders and thrombosis of external hemorrhoids was revealed.

All this together can lead to an increase in the duration of the recovery period, the use of repeated operations. We consider the following disadvantages of the twisted suture: this suture does not provide restoration of damaged anatomical structures: Treitz muscles and Parks ligaments. The twisted nature of the seam with multiple punctures and punctures leads to additional trauma and tissue infection; continuous suture "pulls" the mucous membrane, leading to its ischemia; continuous twisted seam makes it difficult to "slide" the thread in the tissues, leads to its entanglement, does not provide complete pulling of the knot; in the absence of clear boundaries between the external and internal nodes, there is a high probability of imposition of the lower turns of the seam on the area of the dentate line and even below it, which will necessarily be accompanied by a pronounced postoperative pain syndrome; gross deformation of the walls of the anal canal with twisted seams; questionable possibility of application at the 4th stage of hemorrhoids due to insufficient "lifting effect".

## **Conclusion**

The use of a Latex ligation and performing transanal Doppler-controlled dearterization of internal hemorrhoids, supplemented by mucopexy and lifting of the mucous membrane, in patients with hemorrhoids of the disease

can improve the early post-manipulation period, reduce pain syndrome, bleeding, and stop the symptoms of hemorrhoidal prolapse.

## **Recommendations**

This methodic of a Latex ligation and methodic THD may recommendation for treatment of patients with internal hemorrhoidal nodes.

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## **Scientific Ethics Declaration**

The authors declare that the scientific ethical and legal responsibility of this article published in EPHELS journal belongs to the authors.

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